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(54) **Optical scanning apparatus for reading coded symbols.**

(57) A portable coded symbol scanning apparatus comprises a housing member (20) having a pair of sloping supporting surfaces (32,38) orientated at an angle to each other and a floor portion on which is mounted a reflecting mirror (48). One of the sloping supporting surfaces (32) includes a transparent plate (34). A portable hand-held optical scanner (30) is positioned adjacent the other sloping supporting surface (38) for projecting a plurality of scanning light beams (50) in the form of a scan pattern at the reflecting mirror (48) which reflects the scan pattern on to the transparent plate (34) over which a coded label is passed enabling the scanning light beams (50) to scan the coded label. A magnet (46) mounted adjacent the other sloping supporting surface (38) is sensed by a sensor (44) mounted in the hand-held scanner (30) for generating control signals which are used in operating the scanner (30) in different modes of operation depending on whether the scanner (30) is mounted on the housing (20) or is used manually to scan a coded label.

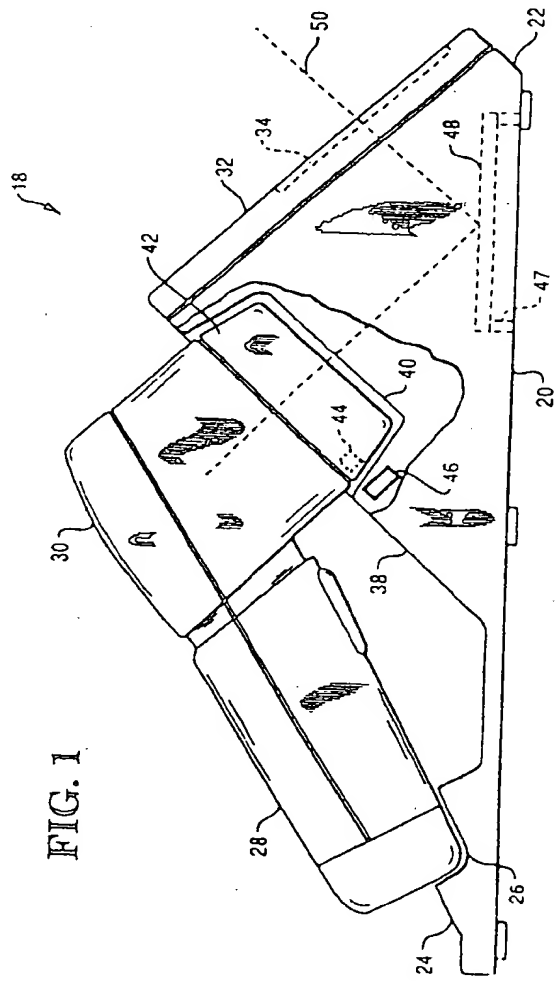


FIG. 1

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The present invention relates to an optical scanning apparatus and more particularly to a portable coded symbol scanning apparatus which can be operated in a hand-held mode or a fixed hands-free mode.

In present-day merchandising point-of-sale operations, data pertaining to the purchase of a merchandise item is obtained by reading encoded indicia such as a bar code label printed on or attached to the merchandise item. In order to standardize the bar codes used in various point-of-sales checkout systems, the grocery industry has adopted a uniform product code (UPC) which is in the form of a bar code. Reading systems which have been constructed to read this type of bar code include hand-held wands which are moved across the bar code, and stationary optical scanning systems normally located within the cabinet structure of a checkout counter, in which the bar code is read when a purchased merchandise item is moved across a window constituting the scanning area of the counter, which movement is part of the process of loading the item into a baggage cart. Where the merchandise consists of soft materials such as clothing, hand-held scanners were found to be ineffective under certain circumstances. A need has arisen for a bar code scanning device that combines the advantages of both a hand-held, as well as a fixed, hands-free scanner. Such an arrangement is described in US-A-4,766,297 which discloses a scanning device that can be utilized in either a portable mode of operation or a stationary mode of operation. The scanning device includes a portable hand-held scanner and a fixture for receiving and supporting the scanner. The fixture includes a base portion and a head portion interconnected in a spaced apart relationship. When the hand-held scanner is attached to the fixture, it can be operated as a fixed, over-head scanning apparatus. The fixture further includes means for sensing the presence of an object between the head portion and the base portion for automatically initiating reading by the hand-held scanner. A disadvantage of this structure is that it must necessarily be of a non-compact nature since the distance between the components of the sensing arrangement must be such as to allow even bulky objects to pass therebetween.

It is an object of the present invention to provide a scanning apparatus in which the above disadvantage is alleviated.

Thus according to the invention there is provided an optical scanning apparatus for reading coded symbols including a hand-held scanning device, and a support structure for supporting said scanning device when used in a hands-free mode, characterized by sensing means mounted in said hand-held scanning device for operating said device in response to sensing the positioning of said device on said support structure.

An advantage of the scanning apparatus of the invention is that the operating performance of the

scanner may be enhanced by altering the parameters of scanning. The electronics associated with the operation of the hand-held scanner will observe the scanning mode of the scanner so as to initiate an operation thereof or to alter the parameters of scanning. Thus, for example, the level of intensity of the scanning light beams may be increased when the apparatus is used in a hand-held mode.

The invention will now be described by way of example with reference to the accompanying drawings wherein like reference numerals indicate like or corresponding parts throughout the several views and wherein:

Fig. 1 is a right side elevational view of a portable optical bar code scanning apparatus of the present invention with a portion of the housing member removed showing details of the mounting of a hand-held scanner within the scanning apparatus and the location of a magnet within the housing member and a magnetic sensor within the scanner;

Fig. 2 is a view similar to Fig. 1 showing the hand-held scanner removed from the housing member.

Fig. 3 is a block diagram of the operating system of the hand-held scanner.

Referring now to Fig. 1, there is shown a side view of the bar code scanning apparatus of the present invention generally indicated by the numeral 18 which includes a housing member 20 comprising a front housing portion 22 and a rear portion 24 including a cutout portion 26 to accommodate the rear end portion 28 of a hand-held bar code optical scanner 30. The front housing portion 22 includes a sloping front surface 32 which includes a transparent plate 34 mounted therein on which is projected a scanning pattern (not shown).

The housing member 20 further includes a rear sloping surface 38 which includes a recessed portion 40 in which is positioned a head portion 42 of the optical scanner 30. Mounted in the head portion 42 is a magnetic sensor or switch 44 which may comprise a Hall sensor. An example of a Hall sensor that is commercially available is Part No. UGN-3040T/U manufactured by The Sprague Electric Co. of Concord, New Hampshire. Mounted in the front housing portion 20 adjacent the recessed portion 40 is a magnet 46. Mounted on a support member 47 secured to the floor of the housing member 20 is a mirror member 48 which reflects scanning light beams projected along the beam axis 50 by the hand-held scanner 30. The scanning light beams in the form of a scanning pattern (not shown) are reflected from the mirror member 48 to be focused on the surface of the transparent plate 34 enabling the operator to position the bar code label which is to be scanned adjacent the scanning pattern.

Referring to Fig. 3 there is shown a system block diagram of the hand-held scanner 30 which includes a battery 52, a microprocessor 54, the magnetic sen-

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sor or switch 44 coupled to the battery 52 and the microprocessor 54, a motor 56 coupled to the microprocessor 54, used in generating a plurality of scan lines in a manner that is well known in the art, and a laser diode 58 coupled to the microprocessor which generates the laser scanning light beams used in scanning the bar coded label.

In the operation of the bar code scanning device 18 the operator will position the end portion 28 of the hand-held scanner 30 within the cutout portion 26 of the housing member 20. The operator will then insert the head portion 42 of the scanner 30 within the recessed portion 40 of the housing member, which movement positions the sensor 44 adjacent the magnet 46. In sensing the presence of the magnet 46, the sensor 44 will output a control signal to the microprocessor 54 which enables the microprocessor to alter several parameters to enhance the performance or usability of the scanner 30 when mounted in the housing member. This includes initiating the operation of the scanner by energizing the motor 56 and the laser diode 58. When the scanner 30 is removed from the housing member 20, the sensor 44 will generate a second control signal enabling the microprocessor 54 to control the scanner 30 for a normal hand-held scan operation. While a magnet has been disclosed as the source of sensing energy, it is obvious that other sources of sensing energy may be used. Thus element 46 (Fig. 2) may comprise a photodiode whose light output can be detected by a photodetector mounted in the scanner.

It may be seen that the present invention enables the microprocessor 54 (Fig. 3) to know the mode of operation of the hand-held scanner 30. Where the scanner is to be positioned on the housing member 20 during a scanning operation, the signals generated by the sensor member 44 enables the microprocessor to energize the motor 56 and the laser diode 58 for a hands-free scanning operation. When the scanner 30 is to be operated in a hand-held operation, the removal of the scanner from the housing member results in the sensor member generating signals notifying the microprocessor of this type of scanning operation which may operate the laser diode to increase the intensity of the scanning light beams.

Claims

1. An optical scanning apparatus for reading coded symbols including a hand-held scanning device (30), and a support structure (20) for supporting said scanning device (30) when used in a hands-free mode, characterized by sensing means (44) mounted in said hand-held scanning device (30) for operating said device in response to sensing the positioning of said device on said support structure (20).

2. An apparatus according to claim 1, characterized in that said sensing means (44) is arranged to generate a first control signal in response to sensing the positioning of said hand-held scanning device (30) on said support structure (20), and in that control means (54) are provided coupled to said sensing means (44) for controlling the operation of said hand-held scanning device (30) in a first mode in response to generation of said first control signal, whereby the scanning light beams (50) are projected on to a coded label positioned adjacent a scanning surface (32,24) of said support structure (20).

3. An apparatus according to claim 2, characterized in that said sensing means (44) is arranged to generate a second control signal when said hand-held scanning device (30) is removed from said support structure (20), said control means (54) operating said hand-held scanning device (30) in a second mode of operation in response to the generation of said second control signal, wherein in said second mode of operation a coded label is scanned by manually moving said hand-held scanning device (30) across a coded label.

4. An apparatus according to anyone of claims 1 to 3, characterized by operating means (46) mounted in said support structure (20) for bringing about operation of said sensing means (44) when positioned adjacent thereto.

5. An apparatus according to claim 4, characterized in that said operating means (46) is a magnet and said sensing means (44) is a magnetic sensor.

6. An apparatus to claim 4, characterized in that said operating means (46) is a light source and said sensing means is a photodetector.

7. An apparatus according to any one of the preceding claims characterised in that said hand-held scanning device (30) has a nose portion (42) and in that said support structure (20) has a recessed portion (40) shaped to accommodate said nose portion (42).

8. An apparatus according to claim 7, characterized in that said operating means (46) is mounted in said support structure (20) adjacent said recessed portion (40), and said sensing means (44) is mounted on said nose portion (42) of said hand-held scanning device (30).

9. An apparatus according to any one of the preceding claims, characterized in that said support structure (20) includes an exterior transparent plate (34), mirror means (48), and holding means

for holding said hand-held scanning device (30) so that in operation scanning light beams from said device are reflected from said mirror means (48) out of said support structure (20) through said transparent plate (34), said transparent plate lying within the depth of field of said scanning device (30) when held by said holding means.

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FIG. 1

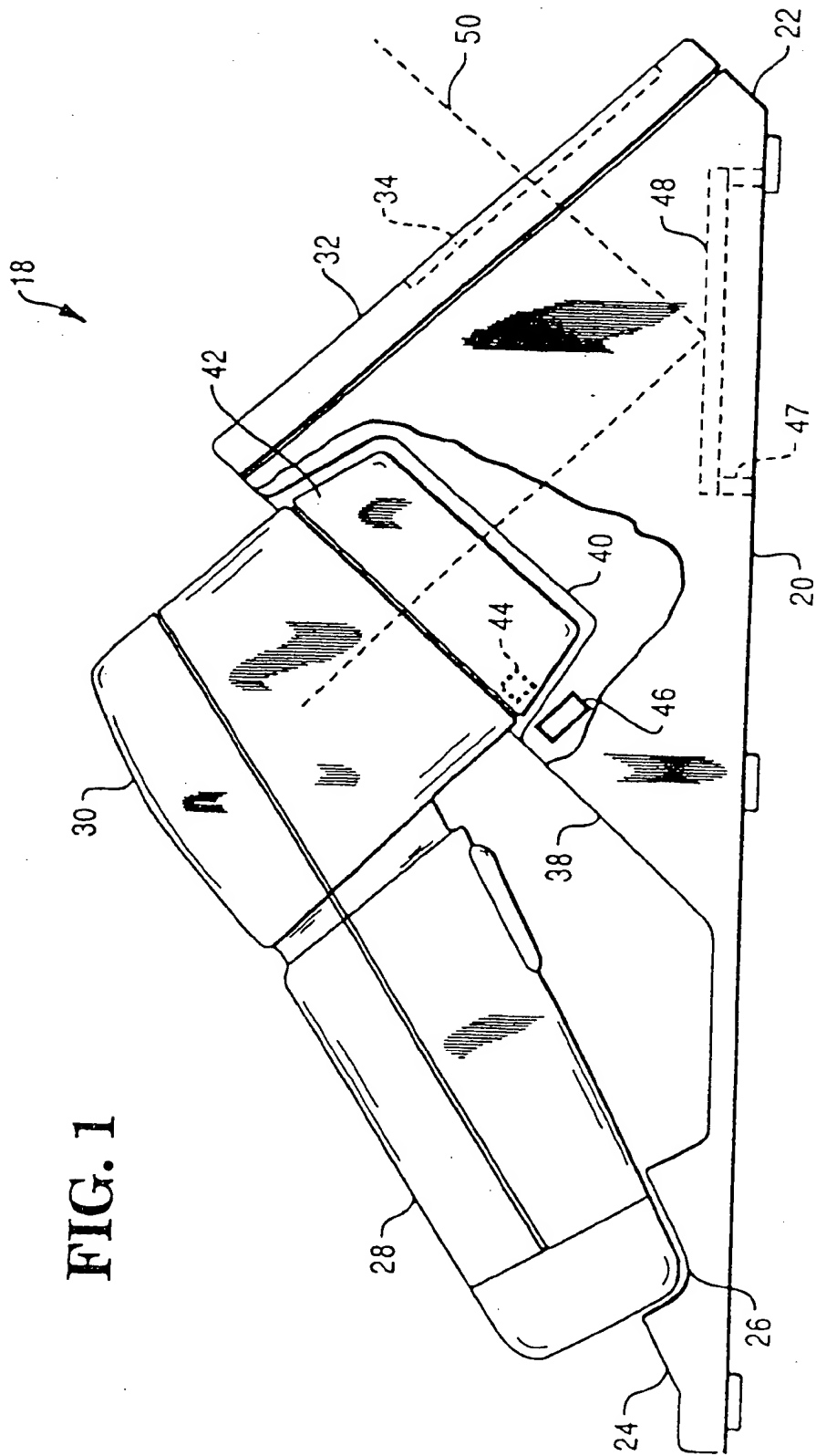


FIG. 2

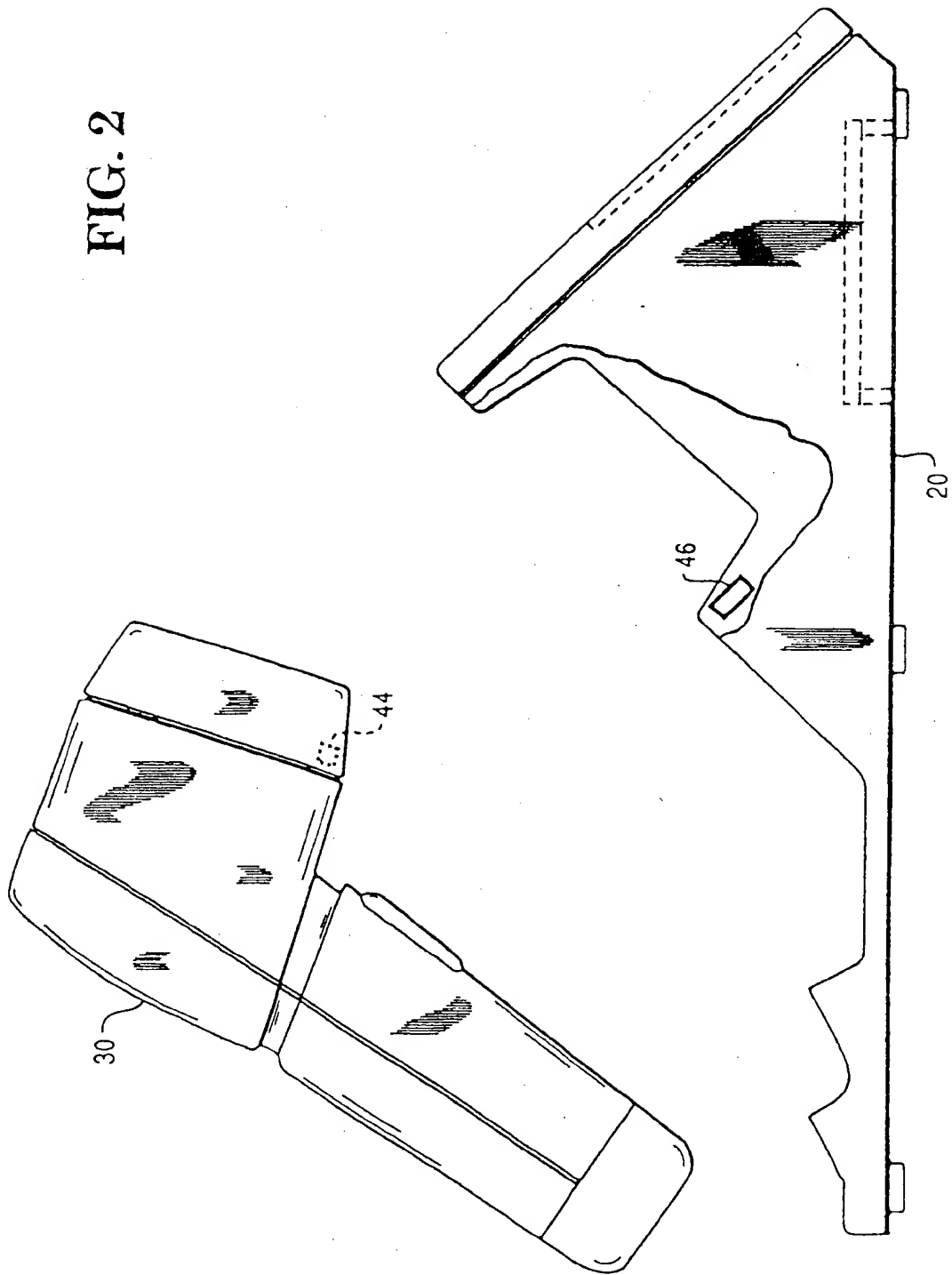
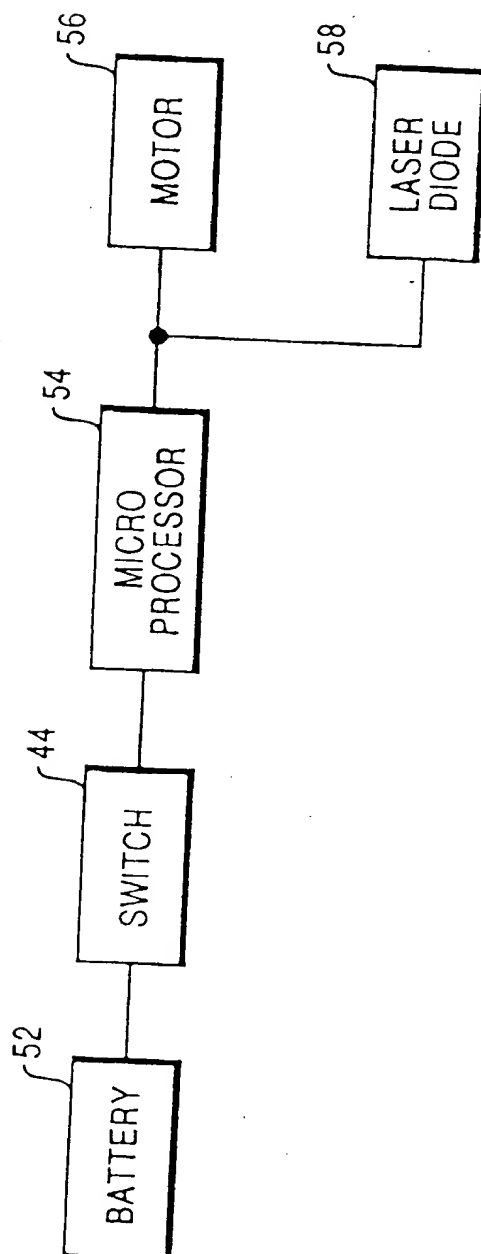


FIG. 3





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EUROPEAN SEARCH REPORT

Application Number

DOCUMENTS CONSIDERED TO BE RELEVANT			EP 91311412.0
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int. Cl.5)
A	<p><u>EP - A - 0 347 814</u> (TOKYO) * Abstract; fig. 1 *</p> <p>-----</p>	1, 2	<p>G 06 K 7/10 G 06 K 7/14</p>
			<p>TECHNICAL FIELDS SEARCHED (Int. Cl.5)</p>
			<p>G 06 K</p>
The present search report has been drawn up for all claims			
Place of search	Date of completion of the search	Examiner	
VIENNA	18-03-1992	MIHATSEK	
<p>CATEGORY OF CITED DOCUMENTS</p> <p>X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document</p> <p>T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons Δ : member of the same patent family, corresponding document</p>			

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